Nonlinear Phase Noise Compensation in Experimental WDM Systems with 256QAM - DTU Orbit (15/02/2019)

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Nonlinear phase noise (NLPN) is studied in an experimental wavelength division multiplexed (WDM) system operating at 256QAM. Extremely narrow linewidth lasers (<1 kHz) at the transmitter and the receiver allow for extracting the phase part of the nonlinear noise in a Raman amplified link. Based on the experimental data, the autocorrelation function of the NLPN is estimated and it matches the theoretical predictions. Several algorithms are examined as candidates for tracking and compensating the NLPN. It is shown that algorithms which exploit the distribution of the NLPN achieve higher gains than standard methods, which only exploit the correlation properties. Up to 300 km reach increase is achieved for a 5x10 GbAud WDM system with base distance of up to 1600 km. The gains are comparable to the gains of single channel digital back-propagation, with even further improvements from the combination of both techniques.

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